BEALE STREETSCAPE DESIGN

CITY OF KINGMAN PROJECT NO. ENG19-0079

TECHNICAL SPECIFICATIONS

PREPARED FOR:

CITY OF KINGMAN
ENGINEERING

PREPARED BY:

4600 E Washington, Suite 600
Phoenix, AZ 85034

DATE: JUNE 2023

Table of Contents

PROFESSIONAL ENGINEER SEALS

These Technical Specifications and related contract documents represent the efforts of the firms or groups listed below. Adjacent to each are the corresponding sections within these Special Provisions that were prepared under their direction.

(1) WSP USA ENVIRONMENT AND INFRASTRUCTURE, INC.
(2) HARRINGTON PLANNING + DESIGN

A registered professional from each firm has affixed her/his seal below which attests that those portions of these specifications which relate to the drawing numbers appearing with the seal were prepared under her/his direction.

Sheet Numbers 1-34
WSP USA ENVIRONMENT AND INFRASTRUCTURE, INC.

vv

Drawing Numbers 35-47
HARRINGTON PLANNING + DESIGN – Landscaping Plans

PART 100 – GENERAL CONDITIONS

Technical Specifications and Details:

Except as otherwise indicated in these Technical Specifications and on the project plans, the work for this project shall conform to the following manuals, standard details, and specifications:

The City of Kingman Addendums to the Maricopa Association of Governments (MAG) Uniform Standard Specifications and Details for Public Works Construction, 2017 edition in conjunction with the City of Kingman Standard Details, 2020 edition, except as modified in the plans.

U.S. Department of Transportation, Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) for Street and Highways, 2009 Edition.

MAG Uniform Standard Specifications for Public Works Construction, 2022 Revision to the 2020 Edition.

Link:

https://azmag.gov/Portals/0/Documents/MagContent/2022_MAG_Uniform_Standard_Specifications_for_Public_Works_Construction_SPECS_FINAL.pdf

MAG Uniform Standard Details for Public Works Construction, 2022 Revision to the 2020 Edition.

Link:

https://azmag.gov/Portals/0/Documents/MagContent/2022_MAG_Uniform_Standard_Details_for_Public_Works_Construction_DETAILS_FINAL.pdf

Arizona Department of Transportation (ADOT) Standard Specifications for Road and Bridge Construction, 2021.
Link: https://azdot.gov/business/contracts-and-specifications/specifications

ADOT Standard Drawings, Latest Editions.
Roadway Drawings (C-Standards):
Link: https://azdot.gov/business/engineering-andconstruction/roadway-engineering/roadway-design/construction-standard

General Conditions:

This project shall conform to the City of Kingman General Conditions as found in this document.

SECTION 101 ABREVIATONS AND DEFINITIONS

101.1 ABREVIATIONS: is modified to add

COK: the City of Kingman

101.2 DEFINITIONS AND TERMS:

CITY: is replacing the following

"A Municipal Organization, City of Kingman, organized and existing under and by the virtue of the laws of the State of Arizona."

SECTION 102 BIDDING REQUIREMENTS AND CONDITIONS

102.3 INTERPRETATION OF QUANTITIES Replace Section as follows:

It is expressly understood and agreed by the parties hereto that the quantities of the various classes of work to be done and materials to be furnished under this Contract, which have been estimated as stated in the Proposal, are only approximate and are to be used solely for the purpose of comparing, on a consistent basis, the proposals offered for work under this Contract; and the Contractor further agrees that the City of Kingman will not be held responsible if any of the quantities shall be found incorrect. The Contractor will not make any claim for the damages or for loss of profits because of a difference between the quantities of the various classes of work as estimated and the work actually done. If any error, omission, or misstatement is found to occur in the estimated quantities, the same shall not invalidate this Contract or release the Contractor from the execution and completion of the whole of any part of work in accordance with the Specifications and Plans herein mentioned, and for the prices herein agreed upon and fixed therefore, or excuse him from any of the obligations or liabilities hereunder, or entitle him to any damage or compensation except as may be provided in this Contract.

SECTION 104 SCOPE OF WORK

104.1.4 CLEANUP AND DUST CONTROL Add new subsection 104.1.4.1 – Site Maintenance:

To maintain a clean construction site, all demolished materials, to include but not limited to, asphalt pavement, concrete, rock, and dirt shall be removed from the site by the end of each work shift. Stock piling of excess materials on site shall not be allowed. The only material to be stockpiled on site shall be materials specifically intended for use or re-use the same work shift. The Contractor may, if approved by the City, place or stockpile materials in the public right-of-way provided they do not prevent access to adjacent properties or prevent compliance with traffic regulations. Traffic shall not be required to travel over stockpiled materials, and proper dust control shall be maintained. No material, when stockpiled shall alter in anyway the existing

drainage pattern.

SECTION 105 CONTROL OF WORK

105.6 COOPERATION WITH UTILITIES: Is modified to add:

The contractor shall perform all requirements as prescribed in A.R.S. 40-360.21 through .32. At least two working days prior but no more than 15 working days prior to commencing excavation, the contractor shall contact ARIZONA 811, between the hours of 6:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays, for information relative to the location of buried utilities. The contractor can call 811 from anywhere in Arizona or can contact ARIZONA 811 at the number below: (602) 263-1100. The contactor can also create and manage utility locate tickets online by using the Arizona 811 E-Stake tool at www.Arizona811.com.

The location of the underground and overhead utilities as shown on the project plans is based on the best available information obtained from utility companies and supplemented by surveying and potholing. The contractor shall not assume that this represents an exact location of the utility. No guarantee is made to the accuracy of the location shown on the project plans. The contractor shall determine for the exact location of all utilities.

The contractor is responsible for maintaining and supporting all utilities (not identified for relocation or removal) crossing the open trench for the length of the project. All utilities crossing the open trench shall be protected to the satisfaction of the Utility Owner. Any damage to the existing utilities within the construction area shall be repaired by the contractor to the satisfaction of the Utility Owner at no additional cost to the City.

Power lines and other utilities may be at various locations throughout the project limits. However, they are not anticipated to be in conflict. All work at or in close proximity to said lines shall be performed in accordance with all Federal, State, and local laws and regulations, including but not limited to:

(1) Arizona law regarding "Underground Facilities" (A.R.S. 40-360.21 to .32).

(2) Arizona law regarding "High Voltage Power Lines and Safety Restrictions" (A.R.S. 40-360.41-.45).

(3) The Occupational Safety and Health Administration.

(4) The National Electric Safety Code.

Utility Companies:

Company	Representative	Phone
AT&T	Joseph Forkert	(714) 963-7964
Frontier Communications	Kelly Cook	(928) 681-8051
NPG Cable/Suddenlink	Jay Rodriguez	(928) 201-7227
Unisource Electric	Marvin Yarbrough	(928) 681-8928

Unisource Gas	Will Van Oosting	(928) 715-1261

SECTION 106 CONTROL OF MATERIALS

106.2 SAMPLES AND TESTS OF MATERIALS: Is modified to add:

The Contractor shall employ and pay for an independent testing laboratory acceptable to the Engineer to provide all materials testing for the project. It shall be the responsibility of the Contractor to control his operations by confirmation tests to verify and confirm that he has complied, and is complying at all times, with the requirements of these Specifications concerning control of materials and testing. Copies of the test reports shall be submitted promptly to the Engineer. The required testing shall address all elements which affect the quality of any material or aspect of the project, and includes, but is not limited to, the quality of the subgrade, backfill materials, aggregate base, chips, oil, concrete and asphaltic concrete, and shall include, but not be limited to the following:

A. Mix designs
B. Aggregate Production
C. Quality of Components
D. Stockpile Management
E. Proportioning
F. Mixing, including addition of Mineral Admixture, if required
G. Placing and Finishing
I. Compaction

The Engineer may provide quality acceptance sampling and testing. The number of tests and location of each shall be determined by the Engineer. The expense of quality acceptance sampling and testing shall be paid for by the City. Additional sampling and testing required due to failure of the initial test(s) shall be accomplished as provided by the City and these additional expenses shall be deducted from moneys due the Contractor. Construction quality acceptance testing performed by the City of Kingman does note relieve the Contractor or the manufacturer of materials produced for the Contractor, of the obligation to perform and documents quality control testing of materials and workmanship.

Measurement and payment for Quality Control will be made at the Lump Sum (LS) contract unit price, which price shall be full compensation for completion of compliance testing and provision of copies of all test results, and performing all work as specified herein.

SECTION 107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

107.6 PUBLIC CONVENIENCE AND SAFETY: Is modified to add:

Contractor and the City of Kingman will work with local businesses to coordinate traffic control and access. During construction, driveways on Beale Street will be closed. The residents/businesses affected during construction shall be contacted a minimum of 48 hours prior to commencement of construction.

107.9 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE: Is modified to add:

Construction on private property as shown on the plans is per the written consent of the property owner. The property owner will be notified 48 hours in advance prior to entry and performing work. Work within the property will be limited to 8 AM to 5 PM, Monday – Friday, unless otherwise scheduled and approved by the property owner. The Contractor will restore all disturbed areas per the requirements included within this Section. The Contractor is responsible for repairing any damages that occur on the property as a result of this project.

No separate measurement or payment will be made for the restoration of property, existing landscape, and irrigation. The cost of restoration shall be included in the unit prices for the work which might cause the disturbance.

SECTION 108 COMMENCEMENT, PROSECUTION AND PROGRESS

108.5 LIMITATION OF OPERATIONS: Is modified to add: New Subsection 108.5.1 Work Hours.

To minimize the inconvenience to local businesses, residents, the traveling public and special events in the downtown area, the work may be allowed, at the City's discretion, to be performed at nighttime between the hours of 6:00 PM and 5:00 AM on weeknights, starting on Sunday night and ending on Friday morning.

No extra payment shall be made for meeting the above stated requirements. The City shall have the right to make modifications to these requirements in the best interest of the community.

SECTION 109 MEASUREMENTS AND PAYMENTS

109 Is modified to add:

Changes in the scope of work and/or contract payments must be authorized by the Owner's approval of a Contract Change Order prior to the completion of such work. Work completed without the authorization of the Owner will not be eligible for measurement or payment.

Contrary to the provisions of Section 109.4.1 of MAG Specifications, no adjustment in unit price will be made for changes in quantity greater than 20 percent.

PART 200 – EARTHWORK

SECTION 211 FILL CONSTRUCTION

211.1 DESCRIPTION: *Add the following:*

This work also includes placement of fill as required to meet the contours and grades as indicated on the project plans. Per the geotechnical memorandum, all existing in-situ material is suitable for subgrade.

211.2 PLACING:

Delete the first paragraph and replace with the following:
Rocks or other solid material which are larger than 4 inches in greatest dimension shall not be placed in fill areas. Broken concrete or asphalt shall not be placed in the fill.

Delete the third paragraph and replace with the following:
Clods or hard lumps of earth of 4 inches in greatest dimension shall be broken up before compacting the material in the embankment.

Delete the fourth paragraph and replace with the following:
Fill material with large rocky material greater than 1 inch, or hard lumps such as hardpan or cemented gravel is not acceptable as fill material as shall be removed from the project by the contractor. Per potholing performed by the Contractor during preconstruction, caliche is present throughout the existing subgrade. This caliche is suitable for embankment fill and shall be tracked in with steel tracks or steel rolling equipment.

211.3 COMPACTING: *Delete the seventh paragraph and replace with the following:*

The interstices around the rock in each layer shall be filled with earth or other fine material and compacted. Broken Portland cement concrete and bituminous pavement shall not be permitted in the fill.

PART 300 – STREETS AND RELATED WORK

SECTION 300 STREETS AND RELATED WORK

300 Add the following section*:* Sawcut

300.1 DESCRIPTION:

(A) The work under this section shall consist of saw cutting existing pavement where new asphalt concrete (AC) pavement is to match existing AC pavement with no stipulations for overlaying the entire pavement section. This section also includes saw cutting existing Portland cement concrete pavement (PCCP), sidewalks, ramps, driveways, valley gutters, concrete curb and gutter,

concrete curb and parking areas where new construction shall match the existing grade of surface that are to remain as indicated on the plans or as designated by the Engineer. The minimum width of the saw cut shall not be less than two feet wide per KA Section 336.2.2.

(B) All saw cuts shall be made to the full depth of the material to ensure a neat line. Paved surfaces designated to remain that is damaged by the saw cutting shall be replaced in kind at the expense of the Contractor.

(C) If the saw cutting of existing PCCP, sidewalks, ramps, driveways, valley gutter, concrete curb and gutter and concrete single curb falls within 30 inches of a joint the concrete shall be removed to the joint.

(D) Measurement for AC pavement and PCCP saw cut and removed will be measured in square yards regardless of the existing pavement depth. Measurement for sidewalks, ramps, driveways and valley gutters saw cut and removed will be measured in square feet regardless of the existing concrete depth. Measurement for concrete curb and gutter and concrete curb saw cut and removed will be measured in linear feet.

(E) Payment for AC pavement and PCCP saw cut and removed will be measured in square yards regardless of the existing pavement depth. Payment for sidewalks, ramps, driveways and valley gutters saw cut and removed will be measured in square feet regardless of the existing concrete depth. Payment for concrete curb and gutter and concrete curb saw cut and removed will be measured in linear feet. Payment includes all material, equipment and labor to saw cut, remove and dispose of surplus material.

SECTION 301 SUBGRADE PREPARATION

301.2 Preparation of Subgrade: *Replace the first paragraph with the following:*

The Contractor shall not use asphalt concrete or other bituminous roadway surfacing materials as embankment fill.

301.7 Measurement: *Add the following:*

Unsuitable Material removal and replacement with aggregate base material shall not be measured, and payment for this item shall be included in the unit price for Subgrade Preparation. Per the geotechnical memorandum, all existing in-situ material is suitable for subgrade. Should unsuitable material be encountered, this will be addressed through the use of contingency.

SECTION 336 PAVEMENT MATCHING AND SURFACE REPLACEMENT

336.2.4.1 Permanent Asphalt Replacement: *replace the first sentence and paragraph A in its entirety with the following:*

The asphalt concrete pavement section replacement shall be as indicated on the plans.

(A) Asphalt concrete pavement shall conform to Section 710 for a C-3/4" mix

336.5 Payment: *is replaced in its entirety with the following:*

Payment for the accepted quantities of removal of asphaltic concrete, including hauling and disposal, will be made by the square yard.

Payment for the accepted quantities of new asphaltic concrete pavement replacement will be made by the square yard.

SECTION 340 CONCRETE CURB, GUTTER, SIDEWALK, CURB RAMPS, DRIVEWAYS, STAMPED CONCRETE

Add the following new subsections:

340.3.3.2 Concrete Driveway Entrances and 9" Concrete Slabs:

All driveways shall be in accordance with the details as specified on the plans. Depressed curb adjacent to the driveway shall be measured and paid for at the contract unit price for the type of curb used at that location.

The 9" concrete slab is to be constructed behind the concrete driveway to match existing concrete areas as shown on the plans and in accordance with COK Standard Detail 230. The concrete slab will be constructed on prepared subgrade per Section 301 without reinforcement. Concrete shall comply with Table 725-1 for Class A, 3000 psi. The Contractor shall furnish all labor, materials and equipment necessary for the construction of the concrete slab in accordance with these specifications and in reasonably close conformity to the lines, grades, thicknesses and details indicated by the plans or as established by the Engineer. All tests shall be performed by a laboratory approved by the Engineer.

Construction Joints shall be a maximum of 15 feet apart. The Contractor shall submit a jointing pattern for review and approval prior to construction.

340.3.10 Deficiencies: *Add new Subsection 340.3.10.1 Acceptance*

The Contractor is responsible for protecting the finish surface of concrete by keeping footprints, tire impressions, graffiti, names, etc., from becoming part of the finished product. This may require special scheduling of materials, delivery and/or manpower. All defaced concrete will be replaced by the Contractor at no additional cost to the City. Patching is not acceptable. Cracked concrete will also require replacement. The Engineer shall determine the removal and replacement limits of the damaged/defaced concrete. Removal shall require a neat saw cut edge or removal to the nearest joint.

340.3.11 Sample Panels:

Provide sample panel(s) 5 foot by 5 foot in size, or as stated in the project plans, for approval by the City Construction Manager. Samples of each type of concrete header shall be provided in a 5- foot length by width of header for each finish, and texture as called for on the project

plans. Samples shall incorporate a minimum of one expansion joint and control joint of each type as called for on the project plans. Concrete for samples shall utilize the same approved mix design as will be used in the project work.

Provide as many samples as required for each stamped concrete, to achieve the aesthetic intent and quality of workmanship to the satisfaction of the City Construction Manager. The approved sample panel(s) shall remain in place on site for the duration of the project for a standard of reference for quality.

No separate measurement or payment will be made for the mock-ups, the cost of which is included in the price of the concrete requiring samples.

340.5 Measurement: *Add the following*

Concrete sidewalks, driveways, stamped concrete will be measured to the nearest square foot complete in place. When concrete sidewalk, sidewalk ramps, driveways, and stamped concrete are cut during trenching operations, the square foot measurement for payment will be in accordance with MAG Section 336.

340.6 Payment: *Add the following*

No separate payment will be made for aggregate base course. This item shall be considered incidental to all items in the section.

SECTION 350 REMOVAL OF EXISTING IMPROVEMENTS

350.1 DESCRIPTION: *Replace in its entirety with the following:*

The work under this section shall consist of the removal, wholly or in part, and satisfactory disposal of all structures and obstructions which have not been designated on the project plans or specified in the Special Provisions to remain, except for those structures and obstructions which are to be removed and disposed of under other items of work in the contract. The work shall also include salvaging of designated materials and backfilling the resulting voids. Existing structures, pavement, sidewalks, curbs, gutters and other existing improvements which are to become an integral part of the planned improvements shall remain even though not specifically noted. Materials removed and not designated to be salvaged or incorporated into the work shall be disposed of by the Contractor per the Excess Material Section in the General Conditions Supplement. All existing utilities not designated for removal shall remain in place and be protected against damage. The removal of existing improvements shall be conducted in such a manner as not to injure active utilities or any portion of the improvement that is to remain in place. The following conditions shall apply for removal, replacement and matching of existing improvements to new construction:

1. Provide a minimum of 24” of transition grading from existing improvements to the back of sidewalk, driveway or top of curb to provide a smooth transition between existing grades and the new improvements.
2. Existing improvements shall be removed and replaced as shown on the plans within the 24” minimum transition zone where necessary to construct the new sidewalk, driveway

and/or curbs. This includes concrete, ABC, asphalt/concrete driveway transitions, irrigation components, fences or any other landscape features requiring the transition.

3. Shrubs/low growth vegetation may be trimmed to provide room for forms or other necessary construction devices. Trees shall have branches removed to a minimum of 7' in height where they interfere with pedestrian traffic in sidewalk areas.
4. The Contractor will coordinate with the engineer for the exact limits of the removals and replacements as required at each match up location. Where existing asphalt must be removed for any construction or repairs, the existing asphalt shall be cut back far enough to remove any asphalt edge damaged by construction and shall not be less than 24" wide. The length of the cut shall be sufficient to encompass asphalt that was disturbed by construction activities as directed by the City of Kingman Engineering Representative. ` City of Kingman Contract No. ENG18-0082 42
5. The Contractor shall protect in place existing curb and gutter that is to remain adjacent to existing sidewalk that is to be removed. Any curb and gutter damaged by the Contractor shall be removed and replaced at the Contractor's expense.
6. Pavement replacement for trenches shall be per City of Kingman Standard Detail 200-1. All pavement patches shall be compacted with a vibratory steel wheel roller to the same density specified for asphalt concrete pavement. Widths for pavement replacement shall be as shown in MAG Specifications Table 601-1, "TRENCH WIDTHS". Where widths are shown on the plans, they shall supersede Table 601-1.
7. ABC shall be used for any match up required at unimproved driveways or other locations subject to vehicle or pedestrian traffic behind sidewalks or curbs. Native materials may be used at other locations not subject to vehicle or pedestrian traffic.
8. Meter boxes, fire hydrants, valves, utility risers, or other facilities within the 24" minimum transition zone must be adjusted to final elevations.

350.1.1 CONSTRUCTION REQUIREMENTS: *Add new subsection:*

Items designated to be salvaged shall be carefully stockpiled or stored by the contractor at locations designated in the General Conditions Supplement or as directed by the Engineer. Items which are to be salvaged or reused in the new construction and are damaged or destroyed as a result of the contractor's operations shall be repaired or replaced by the contractor at no additional cost to the City. Holes, cavities, trenches and depressions resulting from the removal of structures or obstructions, except in areas to be excavated, shall be backfilled with suitable material which shall be compacted to a density of not less than 95 percent of the maximum density as determined in accordance with the requirements of Section 601 or Section 211. Backfill of all excavated areas below structures shall be in accordance with Section 206.4.

350.2 CONSTRUCTION METHODS:

350.2.2 Others: *is modified to add:*

Removal of concrete sidewalk, concrete pavement, and curb and gutter shall be to the nearest expansion or tooled joints or as approved by the Engineer. Selected tooled joints shall then be saw cut. If adjacent curb or sidewalk has previously been cracked or damaged by no fault of the contractor, and with direction of the Engineer, additional sections may be removed and replaced.

Removal work shall include posts and other items necessary to remove and adjust fences, gates, signs, and other existing features; filling and compacting all holes left by such removals.

All relocations and adjustments requiring reseating, replacement, or the use of additional materials shall be accomplished using materials of the same or better quality than found in the existing feature, as approved by the Engineer.

Some features may be moved in such a manner that the moved elements and all remaining unmoved portions previously attached to that feature are not damaged. All portions of moved or remaining features that are damaged during the relocation or adjustment shall be repaired, or replaced in kind by the contractor, as approved by the Engineer, at the contractor's expense.

All relocated or adjusted features shall exhibit the same quality and integrity, function, and appearance as the original undisturbed feature. New connecting improvements to either a relocated, adjusted, or unmoved portion of a feature shall be of the same type, quality, and strength as the original feature.

If for any reason the sign, fence, and/or gate cannot be relocated or adjusted within the same working day, the removed portion shall be secured from theft and damage until such time that it can be permanently installed in its final configuration. Whenever applicable, if the move cannot be accomplished within the same working day, a temporary substitute facility shall be provided to secure the enclosure, as approved by the Engineer.

Existing fencing and gates shall be removed and replaced by the business and/or home owners. The contractor and the City of Kingman shall coordinate construction schedule with the businesses or homeowners.

350.4 PAYMENT: *is modified to add:*

No separate measurement or payment shall be made for removal of existing improvements unless otherwise noted on the plans or if removals are included with the bid items. This work shall be considered incidental and included in the unit price bid for construction of the appropriate contract pay items.

PART 400 – RIGHT OF WAY AND TRAFFIC CONTROL

SECTION 401 TRAFFIC CONTOL

401.4 TRAFFIC CONTROL MEASURES: *Add the following:*

In addition to vehicle traffic, sufficient and adequate devices and measures to control the pedestrian traffic in and around the job site shall be provided and erected per the Contractors approved traffic control plan.

401.6 MEASUREMENT: *Remove section in its entirety:*

401.7 PAYMENT: *Remove section in its entirety:*

ADD NEW SECTION 401.8 MEASUREMENT AND PAYMENT:

Measurement and payment for Traffic Control will be made at the Lump Sum (LS) contract unit price, which price shall be full compensation for supplying and maintaining all materials and elements and performing all work as specified herein.

SECTION 403 SIGNING

Work under this item shall be done in accordance with the project plans and requirements of the Manual on Uniform Traffic Control Devices (MUTCD), COK Detail 132 & 133, and ADOT Signing and Marking Standards.

Sign relocations shall include removal of the existing sign panels, posts and bases and re-installation of the original sign panel on new posts and bases in conformance with City of Kingman Standard Detail 132 & 133. Signposts and bases will be measured and paid per each, including the re-installation of the sign panels.

SECTION 430 LANDSCAPING AND PLANTING

430.1 – Description: Modify the first and second paragraphs to read:

This section shall govern the preparation and planting of landscape areas as depicted and as required in the plans and specifications. All materials and products shall be in accordance with MAG Section 795.

Existing utilities and improvements not designated for removal or relocation shall be protected in place. Determine the location of underground utilities (call Blue Stake) and perform all work in a manner, which will avoid possible damages to the utility. The Contractor shall repair any damages at no additional cost to the Owner. Hand excavate around utilities as required.

430.1 – Description: *Add the following:*

The work under this section shall consist of furnishing all labor, materials, and equipment to install decomposed granite, trees, shrubs, accents, and ground covers designated for installation.

430.2 – General: Add the following:

The Contractor shall furnish all labor, materials, equipment, and incidental and appurtenant items of work needed to install the landscape, to the lines and details shown in the plans.

Applicable publications listed below form a part of this specification:

Arizona Nursery Association Growers Committee Recommended Tree Specification (Revised August 2005).

American Standard for Nursery Stock (2004)

The Contractor shall perform all work in accordance with all applicable laws, codes and regulations required by authorities having jurisdiction over such work and provide for all

inspections and permits required by Federal, State, and local authorities in furnishing, transporting and installing materials as shown or for completing the work identified herein.

All planting areas shall be left free of construction debris including but not limited to concrete, grout, re-bar, wood, nails, debris and/or toxic material and graded to a level to permit landscape and irrigation construction. Trenches, foundation backfill, or other filled excavations shall be compacted prior to turning the site over to the Landscape Contractor. Compaction of fill areas for planting shall be at 85 percent maximum. No soil preparation or planting shall begin before the site has been cleared and cleaned of debris. The Engineer shall approve the condition of all planting areas prior to commencement of soil preparation for planting. Commencement of work indicates acceptance of job site conditions by the Contractor.

The Contractor shall cooperate and coordinate with other contractors and trades working in and adjacent to landscape areas.

The Contractor shall maintain stakes set by others until all parties concerned mutually agree upon their removal.

The Contractor shall ship materials with Certificates of Inspection required by governing authorities.

If any of the specified plant material is not obtainable, submit proof of non-availability, together with a proposal for use of equivalent materials, similar in appearance, ultimate height, shape, habit of growth and general soil requirements. The Contractor may make substitutions of a larger size of the same species and variety with the approval by the Engineer and at no additional cost to the Owner.

Before delivery, submit Certificates of Compliance certifying that materials meet the specified requirements. Submit certified copies of the compliance reports for the following materials:

1. Transporting of cacti and landscape plant materials (from the Arizona Department of Agriculture)
2. Soil amendments and conditioners

Certification shall indicate suppliers name, address, telephone number, date of purchase, name, model number and technical description of item purchased, and quantity of each item purchased.

The Engineer reserves the right to take and analyze samples of materials for conformity to the specifications at any time. The Contractor shall furnish the samples upon request. Contractor shall immediately remove rejected materials from the site at the Contractor's expense. The Contractor shall pay for the cost of removing any materials not meeting specifications.

All herbicide/pesticide applicators shall be properly licensed for application of non-restricted use chemicals with an A-20 license or an A-21 license with Pesticide Endorsement from the State Registrar of Contractors and Structural Pest Control Commission. All Landscape Contractors are required to furnish a copy of their application from the Registrar of Contractors, which shall list the names of those employees approved as applicators by the Registrar of Contractors. Application of non-restricted use pesticides shall not take place until the Engineer receives a copy of the application.

As directed by the Engineer, treat all non-paved areas with a chemical contact herbicide, such as Round Up or approved equal, to kill existing weeds. Clear, grub and remove the weeds from these areas after establishing the weed kill to the satisfaction of the Engineer.

Finished grades for landscape areas shall be a smooth, uniform surface, free of abrupt grade changes or depressions. Finished soil grades adjacent to paving, curbs or headers shall be as shown in the drawings and may be adjusted by the Engineer for surface materials.

During the installation of landscape plantings, keep pavements clean and work areas in a neat and orderly condition daily. Remove all debris, trash and excess materials generated by the landscape installation. Sweep, scrub or hose affected areas as directed by the Engineer to maintain a clean and neat work area.

Landscape Contractor shall call for "blue stake" as required. Exercise extreme caution in all planting operations, as there are underground electric and telephone cables, sewer lines and water lines throughout the entire area. Contractor shall study and be familiar with the location of these obstructions and underground utilities. Place plantings where shown on the plans. If there are obstructions or underground utilities, relocate plants clear of any interference at the direction of the City inspector. Landscape Contractor shall repair all damages caused by him to obstructions and underground utilities at no expense to Owner.

Determine location of underground utilities and perform work in a manner, which will avoid possible damage. Hand excavate, as required, to minimize possibility of damage to underground utilities. Maintain grade stakes until removal is mutually agreed upon by all parties concerned. The Contractor shall layout all plant material using stakes or flags to indicate the location of all plant materials. Spacing of shrub and groundcover material shall be as specified in schedule on plans. Determine the location and spacing of trees by the plan scale and locate as accurately as the scale permits. Accomplish preliminary adjustments to conform to actual site conditions acquire the approval of the City Inspector or his authorized representative on the stakeout of all plant material.

Note: Contractor shall not begin planting operations until hardscape is finalized, landscape grading and irrigation system has been installed and is fully operable.

430.2.1 – Repair of Existing Landscape Areas: *Add entire subsection:*

The project work includes the replacement of, or addition of sidewalks and ramps to meet the Americans with Disabilities Act (ADA) and installation or replacement of underground utilities including sewer, water, irrigation, and various electrical and communication lines. The installation of these new ramps, sidewalk sections and underground utilities will impact existing landscape and irrigation systems. It is anticipated that the removal and forming of the new ramps and sidewalks will disturb the existing landscape and irrigation to approximately two feet behind the back of the new ramp or sidewalk section. The contractor shall make the necessary landscape and irrigation repairs necessary to restore the landscape areas disturbed by the ramp and walk installations.

The contractor and the City of Kingman representative shall inspect all landscape and irrigation that is expected to be impacted by the walk and ramp installations prior to the start of construction

activities. The purpose of the inspection will be to establish the existing condition of the landscape and irrigation systems. This inspection shall set a minimum level of performance that the contractor shall meet with the restoration activities.

The landscape repairs will consist of plant replacement, decomposed granite or dust control rock installation, and existing irrigation system restoration.

The irrigation repairs will consist of drip emitter and distribution line replacement, drip PVC and poly lateral line replacement, removal, of and installation of new remote-control valves with wye filters, pressure regulators and valve boxes for drip systems, removal and installation of valve boxes, adjustment, or relocation of other existing water emission equipment.

Landscape rock materials shall match the existing color and gradation. New plant materials shall be sized as follows ground covers-accents-shrubs- 5 gallon.

Irrigation equipment shall be commercial grade equal to or better than that which is existing. All new landscape irrigation piping shall match existing pipe sizes and material. Any new pipe shall be schedule 40 PVC. All fittings shall be schedule 80 for mainline or schedule 40 for lateral lines. All remote-control valve wiring shall be 14 AWG UF-600 for direct burial. Wire splices shall be Dri-splice. All emitters shall be pressure compensating. Turf spray heads shall match existing vendor equipment if disturbed for existing landscape areas.

Contractor shall operate all irrigation within and around all disturbed construction areas to confirm both new and existing irrigation is operational (existing irrigation as determined to be operational prior to construction only). By controllers and emitting water to all plants and grass without leaks or excessive overspray.

All Repair of Existing Landscape Areas shall be guaranteed for one year from the time from project acceptance.

All areas where repairs occur shall be swept clean and washed down by hose prior to final acceptance.

See Civil Plans for the locations of proposed improvements. Existing landscaped areas adjacent to all these locations shall be restored or repaired to the satisfaction of the private property owner (if applicable) and the Engineer.

The Repair of Existing Landscape Areas shall not be measured and will considered included in the item of work(s) being done that disturbs the existing landscape areas. The repairs shall include all required materials, equipment, labor, permits, fees, traffic control, and dump fees necessary to repair all of the impacted landscape and irrigation systems, clean up and dispose of debris.

430.4 Decomposed Granite: *Delete in its entirety and replace with the following:*

A. Decomposed Granite

1. Decomposed granite shall be native, local, desert, decomposed granite stone at the size and color specified on the plans. The decomposed granite shall be from a single source, free from coating, clay, caliche or organic matter. Contractor shall provide City Inspector with a sample of material for approval before installation. Multiple samples may be required.
2. Contractor must examine the subgrade, verify the elevations, and observe the conditions under which the work is to be performed. The existing grade shall be fine graded and raked free of organic matter and other debris 1-inch diameter and larger. Contractor shall apply one application of pre-emergent herbicide as per manufacturer's directions prior to installing granite, one application after granite has been installed, compacted and raked level and one application 30 days prior to the end of the maintenance period. The City Inspector is to be notified prior to all pre-emergent applications.
3. Installed granite shall be raked to remove any irregularities. Installation shall provide a two-inch depth of decomposed granite after compacting. Methods of compacting such as rolling, water settling, etc., shall be approved by the City Inspector. Unless otherwise specified in the drawings, granite finish grade shall be one (1) inch below top of curb or adjacent sidewalk surfaces.
4. All disturbed (non-seed) areas shall be treated with a pre-emergent weed spray "Gallery", or an approved equal. In addition, any existing weeds or Bermuda grass shall be treated with a post-emergent spray, such as "Round-up", or an approved equal. Any existing or new trees or vegetation shall be protected from the spray drift. There will be no separate payment for the weed spraying. Bermuda grass or weeds must be completely eradicated where designated by the Engineer from landscape, sand, or decomposed granite areas.

430.4-1 Decomposed Granite 3/4-Inch minus & 4-8" Cobble Rock COLOR PER LEGEND: Contractor shall supply and place decomposed granite in areas designated on the plans.

Contractor shall provide samples to the **City of Kingman** for all granite specified above for approval prior to placement.

All disturbed areas shall be treated with a pre-emergent and any active weed growing area with a post-emergent spray, such as "Round-up" or an approved equal. There will be no separate payment for the weed spraying. Bermuda grass or weeds must be completely eradicated where designated by the **City of Kingman** from landscape or decomposed granite areas. All weed control products and the **City of Kingman** shall approve herbicides for use prior to any applications. Contractor shall submit copies of all manufacture specifications and application rates to the City for review and approval prior to application. Herbicides and weed control shall only be performed by a licensed applicator; contractor shall supply information on applicator to the **City of Kingman** for approval. Contractor shall apply two applications of pre-emergent herbicide- the first at the time of granite installation and the second within one week prior to the end on the maintenance period. The contractor shall contact the Engineer prior to herbicide application so that the Engineer can inspect the proper mixing and application of the herbicide. The contractor shall guarantee a weed free condition will exist for a 6-month period following the end of maintenance of the project. Should any weeds occur the contractor shall remove and dispose of

all weeds and reapply the pre-emergent herbicide again at no cost to the City. The contractor shall again guarantee a weed free condition for an additional 6 months.

430.5 Accent, Shrub, and Ground Cover Planting: *Add the Following:*

1. The Contractor shall coordinate pre-approval of plant material and delivery with the City and applicable nurseries as required.

2. Upon delivery to the site, all nursery stock shall be planted as soon as possible. Until planting, plants shall not be exposed to excessive sun or drying winds. Stock, which is not satisfactory in the opinion of the City Inspector, shall be immediately replaced with acceptable stock.

3. The planting of all accents, groundcovers, and shrubs shall be performed during favorable weather conditions, during the season or seasons, which are normal for such work, as determined by acceptable local practice.

4. Planting pit **width only** for accents, groundcovers, and shrubs shall be excavated to a volume 3x times the size of the root ball of the plant to be planted. Contractor shall stockpile native soil excavated. The native soil will be used for backfilling planting soil. Scarify the walls of the planting pit.

5. Planting pits shall be backfilled with equal parts in thirds of native soil, humus, and sand and be watered settled to a grade sufficient, that in the setting of the plant, the finish grade level after settlement will be the same as that at which the plants were grown (see details in landscape plans).

6. Container Removal: Remove container by turning plant upside down, supporting root ball with hand and tapping container gently to dislodge plant. Support root ball with both hands until planted in pit. Do not injure root ball or hold plant by the stem.

7. Set container and boxed stock on undisturbed native soil, plumb, and hold rigidly in center of pit or trench with top of ball at elevation as shown on planting details. When set, place additional soil backfill and fertilizer tablets around base and sides of ball, and work each layer to settle planting soil backfill to eliminate voids and air pockets. Working in 6-inch lifts of planting backfill mix water settle the area every twelve (12) inches of depth applied around plant thoroughly before placing next two lifts, repeat process until completed.

8. After removal of plants from containers or sides from boxes superficially cut edge-roots with a sharp knife on one side and tease out feeder roots to assure positive contact and embedment into planting soil.

9. After watering, any settlement within basins shall be refilled to required grade with native soil.

10. Excessively pruned or malformed stock resulting from improper pruning shall be removed from site and replaced at no additional cost to the Owner.

11. Any rock or other underground obstructions shall be removed, if possible, to the depth necessary to permit proper planting, according to plans and specifications. If underground construction, obstructions, or rock are encountered in the excavation of planting areas, other locations of the planting may be selected by the Contractor only upon approval of the City Inspector. Prior to any work, the Contractor must be knowledgeable of the locations of all existing underground installations, and their protection is his responsibility. All damage will be corrected at the expense of the Contractor to the satisfaction of the City Inspector. Coordinate all work with other trades so conflicts will not exist or delay the work in any way. Coordinate grades with earthwork and with placement of irrigation systems fixtures.

430.5.5 – Ground Cover Areas: Delete in its entirety and replace with:

All ground cover plants shall be planted in accordance with Section 430.5.6.

430.5.6 - Shrub and Accent Pits: *Add the following:*

Plant Layout – The Contractor shall stake the location of individual shrubs and accent plants, and layout the perimeter of ground cover areas in accordance with the plans for the Engineer to approve. The Contractor shall also adjust in the plant locations as directed by the Engineer and plant trees, shrubs, ground covers and accent plants after final grades and plant locations are established and approved by the Engineer.

Delivery - Deliver plants just prior to planting. All packaged materials that will be utilized during the planting operation shall be delivered in containers showing weight, analysis, and name of manufacturer. Contractor shall protect materials from deterioration during delivery and while stored on site. Submit certification of contents, quantity and source of all plants and planting materials to the Engineer for approval.

Protection of Plant Materials - If planting is delayed more than 6 hours after delivery, protect the plants from the sun, wind, and mechanical damage. Keep roots and root balls moist watering as often as necessary to maintain good health and vigor. Remove and replace all damaged and unhealthy plants as directed by the Engineer. Do not bend or bind any plants in such a manner as to damage bark, break branches or destroy their natural shape. Provide adequate protection for root systems. Do not handle container plants by their foliage, branches, or trunks.

Pre-Delivery Inspection of Materials - Prior to delivery of any species to the project site, the Contractor shall make the necessary arrangements with the Engineer for an inspection of the plant material. The Contractor will pay for travel and expenses to non-local nurseries, out of the metropolitan Phoenix area, when requested by the Contractor. Any plants found to be unsuitable in growth habit or condition, or plants which are not true to the specification, shall be removed immediately from the site and replaced with acceptable plants.

The Contractor shall notify the Engineer at least 48 hours in advance for any inspection of the plant material at the offsite location. Prior to notifying the Engineer, the Contractor shall physically verify that all the designated plant material meets the specified sizes and conditions.

Construction of Plant Pits and Trenches - Prior to planting, a percolation test shall be performed on all plant pits to determine that adequate drainage exists. Fill the pits half-full with water. Allow

the pits 24 hours to drain. If any pit has not substantially drained, a rock caisson shall be installed. Each caisson shall have a 4-foot deep by 8-inch diameter hole filled with 1-1/2-inch diameter crushed stone filled to the bottom of the pit. Increase the depth of the caissons if ground water, caliche, or impervious rock is encountered.

Provide proper surface drainage within all planted areas. Any grading conditions found in the plans or specifications, in obstructions on the site, or in prior work done by another party that the Contractor feels precludes establishing proper drainage, shall be brought to the attention of the Engineer in writing for resolution.

430.5.6 – Shrub and Accent Pits: *Second paragraph is modified to read as follows:*

Plant backfill mix - The planting backfill mix for shrubs, ground covers and accent plants shall consist of equal parts 1/3 native soil 1/3 stabilized organic material and 1/3 sand. Include 20-10-5 slow-release fertilizer tables at the following rates: 1 gallon - 1 tab, 5 gallon - 2 tabs, 15 gallon – 4 tabs, 24” box – 4 tabs, 30” box – 4 tabs, 36” box – 4 tabs.

430.8 - Plant Guarantee and Maintenance: *Add the following:*

1. Contractor shall begin maintenance immediately after the Engineer has accepted entire plantings.

2. Contractor shall maintain landscape work until final acceptance, but in no case less than 90 days after the work has been accepted by the Engineer.

3. NOTE: Instruct City/Park Maintenance personnel in the proper maintenance of landscape work.

4. The Contractor shall furnish all labor, materials, equipment, tools, services, skill, etc., required to maintain the landscape in an attractive condition throughout the contract period. Maintenance of plant materials shall include, but not be limited to, pruning, weeding, fertilizing, irrigation programming, pest control, and landscaped areas debris clean up, per specifications. Maintenance shall be performed a minimum of once a week throughout the maintenance period.

5. Contractor Supervisor shall be responsible for the training and supervision of the maintenance personnel's performance of their duties during the maintenance period.

6. All materials as noted (but not limited to this list) shall conform to the bid specifications:

    a. Pre-emergent
    b. Fertilizer
    c. Plant material
    d. Decomposed granite

ACCENT AND SHRUB CARE

Maintain trees and shrubs in a healthy, growing condition by performing necessary operations, including the following:

1. Pruning: The Contractor shall prune and shape only as necessary to maintain the usual form of the plant, to stimulate growth, to maintain growth within space limitations, and to maintain a natural appearance.

2. Weed Control: In groundcover area, keep areas between plants free of weeds. Use recommended, legally approved, herbicides whenever possible. Avoid frequent soil cultivation.

GROUNDCOVER CARE

Foster attractiveness at all times by following these practices:

1. Granite Areas: Landscape granite shall be inspected weekly. Man-made debris shall be removed, and weeds and grass controlled with chemicals. Any erosion that has occurred in any granite areas shall be remedied, repaired and granite replaced by the contractor at the contractor's expense.

2. Weed Control: Keep all landscape areas free of broadleaf or grassy weeds, with pre-emergent and/or selective contact herbicides. Cultivating or hoeing weeds is not an allowed practice. Project shall not be accepted until all noxious weeds are eradicated. Treat all planting areas with pre-emergent herbicide prior to granite installation.

Unless otherwise authorized, the Contractor shall maintain all landscape areas on a continuous basis as they are completed during the course of work and until final project acceptance by the Engineer. The Contractor shall provide adequate and experienced personnel to accomplish the maintenance. Maintenance shall include keeping the landscape areas free of debris on a weekly basis, chemical control and hand removal of weeds, fertilization as needed, cultivating the planting areas, and repairing tree stakes. An Arizona pesticide licensed contractor shall perform all chemical control.

All plant material and installation shall be 100 percent guaranteed by the Contractor for an additional 90 Calendar Days following completion of the Plant Establishment Period and the acceptance of the planting areas by the Engineer.

Make replacements of plants within seven (7) days of notification from the Engineer. Remove and replace dead, damaged, or vandalized plants within seven days of notification. Replacements shall be of the same kind and size as originally specified and shall be installed as described in the contract documents.

Plants shall be kept in a healthy, growing condition by watering, pruning, spraying, weeding and any other necessary operation of maintenance. Plant beds shall be kept free of weeds, grass and other undesirable vegetation. Plants shall be inspected by the Contractor at least once per week and appropriate maintenance performed. Pruning and re-staking shall be required as needed to remove any plant growth conflicting with vehicular or pedestrian movement.

The Contractor shall maintain the irrigation system as specified in Section 440 and make any necessary repairs regardless of cause to assure a complete and operational system as originally designed and constructed. Repairs shall be made within 48 hours of detection.

The Contractor shall notify the Engineer 48 hours prior to the application of any chemical treatments. Chemical mixing and the use of application equipment shall be done by qualified personnel in the presence of the Engineer. An Arizona pesticide licensed contractor shall perform all chemical control. The Engineer shall approve the personal, materials and methods of application of chemicals prior to beginning the operation.

There shall be no separate measurement and payment for the Plant Guarantee and Maintenance Period. This cost shall be included in landscape bid items for: plant materials and inert groundcover. Ten percent of each landscape bid item amount in addition to retention will be held for distribution until after the maintenance and establishment period.

430.9 – Plant Establishment Period: *Delete in its entirety and replace with the following:*

The Contractor shall request an inspection by the Engineer when the Contractor believes the landscape work is substantially complete and the planting and related work has been accomplished. After this initial inspection, and subject to his approval of the work, the Engineer will issue a written field notification to the Contractor setting the effective, beginning date for the Plant Establishment Period. The plant establishment period for trees, shrubs, and ground cover shall be for a period of 90 days but is subject to extension by the Engineer if the landscape planting is improperly maintained, appreciable plant replacement is required, or other corrective work becomes necessary. This work will be considered incidental to ITEMS 430-1 through 430-11 within this section and no separate payment will be made for the Plant Establishment Period.

Contractor shall apply two applications of pre-emergent herbicide- the first at the time of granite installation and the second within one week prior to the end on the maintenance period. The contractor shall contact the Engineer prior to herbicide application so that the Engineer can inspect the proper mixing and application of the herbicide. The contractor shall guarantee a weed free condition will exist for a 6-month period following the end of maintenance of the project. Should any weeds occur, the contractor shall remove and dispose of all weeds and reapply the pre-emergent herbicide again at no cost to the City. The contractor shall again guarantee a weed free condition for an additional 6 months.

The contractor shall do a monthly inspection of the landscape and irrigation with the **City of Kingman** inspector. All necessary work items noted during the inspection including but not limited to plant replacements, erosion repairs and irrigation repairs shall be completed prior to the following monthly inspection. Should note repairs not be completed prior to the following monthly inspection the plant establishment period shall be extended for another month.

Removal and disposal of all trash and other debris is included as a part of the plant establishment work. The trash includes materials generated by the contractor and all other outside sources. Trash shall be removed on a weekly basis, minimum.

At final project acceptance or at the end of the plant establishment period, a final acceptance inspection of the planted areas will be made by the Engineer.

430.10 Measurement and Payment: *Add the following:*

Payment for the landscape and planting shall be made on the basis of the bid price for each element of work identified on the bid schedule. These unit cost prices shall be full compensation for the system complete and in-place as described herein and on the plans.

SECTION 440 LANDSCAPE IRRIGATION SYSTEM

440.1 – Description: *Add the following:*

The Contractor shall furnish all labor, materials, tools, equipment, and services necessary for the execution and completion of the irrigation system work as indicated on the drawings and as described in these specifications and the General Conditions.

The plans indicate a detailed layout of irrigation lines, laterals, control equipment, and emitter locations; however, some of the piping may be shown diagrammatically outside of the planting areas for graphic clarity. The contractor shall follow the intent of the plan layout and shall review and obtain written approval from the Owner's Authorized Representative for any requested changes.

Due to the scale of the drawings, it is not possible to indicate all offsets, fittings and sleeves that may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such offsets, fittings and sleeves as may be required to meet such conditions. All work called for on the drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the specifications.

The irrigation system shall be constructed using the emitters, valves, piping, fittings, controllers, wiring, and other components, of sizes and types as shown on the drawings and as called for in these specifications. The system shall be constructed to grades and conform to areas and locations as shown on the drawings.

The project scope involves the installation of new irrigation systems in landscape areas where none exist or where privately-owned systems may exist. The new system shall be installed to **City of Kingman** standards. The **City of Kingman** will operate and maintain the completed systems. Where there are existing systems the contractor shall cut, cap and modify the existing systems as necessary so that the system continues to operate and provide water to the plant materials that remain on the private property.

New **City of Kingman** water meters, controllers, backflows, drip control valves, and emitter systems will be installed to provide water to the new landscape.

New 120-volt electrical work will be required on the project.

See section 430.2.1 for additional irrigation repair work related to the installation of new ramps, walks and driveways.

440.2 – General: Add the following:

Conform to MAG Section 440, 757 and 610 and as further modified herein.

The Contractor shall maintain project record (as-built) drawings during the irrigation system construction as described below:

Maintain on-site and separate from documents used for construction, one complete set of contract documents as Project Record Documents. Keep documents current on a daily basis. Current up-to-date Record Drawings are a prerequisite for scheduled payments. Do not permanently cover work until Record Drawing information is recorded.

Record pipe and wiring network alterations. Contractor shall Record work that is installed differently than shown on the construction drawings. Record accurate reference dimensions, measured from at least two permanent reference points of each irrigation-system valve assembly, each controller, each sleeve end, each wire splice location, each stub-out for future pipe or wiring connections, and all other irrigation components including those enclosed within any valve box.

Completion of the Record Drawings will be a prerequisite for the Final Review.

If quantities are furnished either in specifications or on drawings, quantities are furnished for information only. It is Contractor's responsibility to determine actual quantities of material, equipment, and supplies required by the project and to complete independent estimate of quantities and wastage.

Provide work and materials in accordance with latest edition of National Electric Code, Uniform Plumbing Code as published by the International Association of Plumbing and Mechanical Officials, and applicable laws, regulations, and codes of governing authorities.

All irrigation equipment and materials shall be supplied by the manufacturers as indicated on the plans, details, and specifications. If no manufacturer is specified, the contractor shall supply as part of his submittal package complete manufacturer cut sheets detailing materials, construction methods and standards.

440.2.1 Permits: All permits and fees for installation or construction of the work included under this section, which are required by legally constituted authorities having jurisdiction, shall be obtained, and paid for by the Contractor, each at the proper time. He shall also arrange for and pay all costs in connection with any inspections and examination required by these authorities.

440.2.2 Execution: Examine areas and conditions under which work of this section is to be performed. Do not proceed with work until unsatisfactory conditions have been corrected.

440.2.3 References: Conform to the requirements of reference information listed below except where requirements that are more stringent are shown or specified in the Contract Documents.

American Society of Testing Materials (ASTM) - Specifications and Test Methods specifically referenced in this Section, and Underwriter Laboratories (UL) - UL wires and cables, City of Kingman Supplements to MAG and MAG Standards.

440.2.4 Quality Assurance: Work involving plumbing for installation of meters, vaults, meter boxes, water taps, copper piping, backflow preventer(s) and related work shall be executed by licensed and bonded contractors. Secure a permit from **City of Kingman** at least 48 hours prior to start of installation.

Tolerances: Specified depths of mains and lateral pipes are minimums. Settlement of trenches is cause for removal of finish grade treatment, refilling, re-compaction, and repair of finish grade treatment.

Coordinate work with other trades.

For a period of one year from Final Acceptance, the Contractor shall guarantee/warranty irrigation materials, equipment, and workmanship against defects. The Contractor shall replace any pavement damage resulting from the installation of the irrigation system, repair damage to grading, soil preparation, or planting at no additional costs to the Owner and make repairs within 48 hours following notification by the Engineer.

440.3 – Materials: Add the following:

Submittals shall include but not be limited to the following:

Materials List: Include pipe, fittings, valves and mainline components, water emission components, control system components. Quantities of materials need not be included.

Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating instructions for equipment shown on the materials list.

Shop Drawings: Submit shop drawings called for by the details. Show products required for proper installation, their relative locations, and critical dimensions.

440.3.1 Equipment to be Furnished: *Add entire subsection:*

All materials to be new and bear the appropriate National Association seal of approval for example, NSF, US, etc. Similar equipment shall be procured from the same manufacturer and internal parts shall be common and interchangeable. Parts listing and source replacement will be furnished to the Engineer.

Refer to Section 757 for materials list.

440.3.2 Submittals: *Add entire subsection:*

Shop Drawings and Product Information:
Prepare and make submittals in accordance with conditions of the Contract, and as follows: A minimum of ten days prior to beginning work on the irrigation system the Contractor shall submit six (6) copies of manufacturers' literature including name and numbers covering materials listed below and any other items requested by the Engineer. **Do not order materials until the products are approved by the Engineer**.

Items to be submitted:

- Pipe
- Automatic Controller
- Controller Remote Control
- Drip Equipment
- Fittings and Solvents
- Wire and Connectors
- Backflow Preventer
- Ball Valves
- Gate Valves
- Valve Boxes
- Pressure Regulators
- Backflow Preventer Enclosure
- Automatic Control Valves
- Flow Sensor / Sensing Equipment
- PVC nipples
- Valve I.D. Tags

All items shall be those specified and approved by the Engineer. Substitutions will not be allowed without approval.

440.3.3 Staking: *Add entire subsection:*

Mark with powdered lime, routing of pressure supply line and stake locations of various components, control valves and emitters. Unless otherwise specified, the system layout shall be considered schematic. Preliminary adjustments to conform to actual site conditions shall be accomplished during staking. Should changes be required the Contractor shall obtain approval of the Engineer prior to actual work being performed. Water connection that shall be supplied to the Contractor shall be as shown on the plans or as designated by the Engineer and the utility concerned.

440.5 – Trench Excavation and Backfill: *Add the following:*

Waterlines continuously pressurized – 18 inches minimum for 2-1/2-inch and smaller pipes, 24 inches minimum for 3-inch and 4-inch and 36 inches for 6-inch and larger pipe.

Irrigation Control wire – 18” below grade

Lateral lines – 12 inches minimum for 2-inch and smaller pipes, 18 inches minimum for 2-1/2-inch and larger pipes.

Plastic lines in sleeves under pavement - 18 inches minimum

Each irrigation pipe or wire located beneath asphalt and concrete shall be installed in a PVC Schedule 40 DWV sleeve that is 6-inch or 4-inch diameter minimum or as noted on the plans, and a minimum of twice the combined diameter of the pipe or wires contained within the sleeve.

Pipe trenches shall be straight but if obstructions necessitate a change of direction, the limits of curvature for PVC pipe shall be followed in strict accordance with pipe manufacturer recommendations.

Trenches may be curved to change direction or avoid obstructions within the limits of the curvature for PVC pipe. Minimum radii of curvature are 25 feet for 2-inch diameter pipe, 100 feet for 3- and 4-inch diameter pipe, and 150 feet for 6-inch pipe. All curvature results from the bending of the pipe lengths. No deflection will be allowed at a pipe joint.

440.5.2 Bedding, Backfilling and Compaction: *Add entire subsection:*

Pipe shall be bedded in at least 4 inches of finely graded native soil or sand to provide a firm, uniform bearing. After leveling, the pipe shall be surrounded with additional finely grained native soil or sand to at least 4 inches over the top of the pipe.

Bedding sand shall be required when site conditions dictate and clean backfill meeting the specifications is not available. Bedding sand shall be required under asphalt and concrete pavements such as roadways and parking surfaces.

Trench backfill, sufficient to anchor the pipes, may be deposited before pipeline pressure testing, except that joints shall remain exposed until satisfactory completion of testing.

Trenches and excavations shall be backfilled with clean material from excavations. Remove organic material as well as rocks larger than 1/2-inch in diameter. Place acceptable material in lifts, the height of which shall not exceed that which can be effectively compacted, depending on the type of equipment and methods used. Trenches and excavations shall be backfilled so that the specified thickness of topsoil is restored to the upper part of the trench. Compaction shall be in accordance with Section 301. Water settling of the trenches will not be permitted unless approved by the Engineer.

440.6 – Pipe Installation: *Add the following:*

440.6.1 Piping: Provide pipe, schedule and size as shown on the drawings and per Section 757 and as specified herein.

PVC Pipe: Snake pipe in trench as much as possible to allow for expansion and contraction. Provide a firm, uniform bearing for the entire length of each pipeline to prevent uneven settlement. Installation of pipe shall be installed in accordance with ASAE Standard; ASAE 376. Pipe shall be clean prior to installation and shall be maintained in that condition during installation. When pipe laying is not in progress, the open ends of the pipe shall be closed by means approved by the Engineer.

Sand bedding or fine-grained material shall be provided where ledge rock, hard pan, or boulders are encountered. Compact bedding material to provide a minimum depth of bed between pipe and rock of 4 inches.

Solvent welded joints shall be made in accordance with ASTM D-2855, and the type of solvent and primer recommended by the pipe manufacturers shall be used. Primer and solvent shall be applied to the pipe ends in such a manner that no material is deposited on the interior surface or

forced into the interior of the pipe during insertion. Excess solvent on the exterior of the joint shall be wiped clean immediately after assembly. The pipeline will not be exposed to water for at least 12 hours after the last solvent welded joint has been made.

Schedule 80 pipe shall be used for threaded joints. Solvent will not be used on threaded pipe. Threaded joints shall be hand tightened, with final tightening with a strap wrench as necessary to prevent leaks.

The pipe shall be protected from damage during assembly. All vises shall have padded jaws and only strap wrenches will be used. Any plastic pipe that has been nicked, scarred, or otherwise damaged shall be removed and replaced. Care shall be exercised so that stress on a previously made joint is avoided.

When PVC to metal pipe connections is required, these connections shall be accomplished first. A plastic adapter with external pipe thread should be used, screwing it into the metal internal pipe threads. Use Teflon tape, or equal, on all plastic to metal threaded joints. The joint shall be hand-tightened. Utilize a light wrench, as necessary, to prevent leaks.

Piping or conduit of different trades crossing each other shall be separated by a minimum of 6 inches in the vertical direction.

440.6.1 Sleeving: Piping located under asphalt, concrete, or other pavements shall be sleeved, size and schedule as noted on the plans. If not noted, sleeves shall be Schedule 40, and 2 times larger than the pipe being sleeved. Use separate sleeve within the main sleeve for wiring, or as directed by Engineer.

Boring will be permitted only where pipe must pass under obstructions which cannot be removed or when approved by the Engineer. When any cutting or removal of asphalt and/or concrete work is necessary, it shall be saw cut in accordance with Section 601. All sleeve trenches shall incorporate MAG 200-1 T-Top trench repairs. Cost of trenching and patching shall be considered incidental to the sleeve installation. Permission to cut asphalt or concrete shall be obtained from the Engineer. When piping on the drawings is shown in paved area, but running parallel and adjacent to planted areas, the intent of the drawings is to install the piping in the planted area.

Extend sleeve ends twelve inches beyond edge of hardscape, or sidewalks. Cap sleeve ends and mark with stakes. Provide rope or wire through sleeve and secure to a stake at surface grade, at each end for future sleeve location. Sleeve ends shall be covered with duct tape prior to backfill.

Boring operations and/or asphalt cut and patch operations necessary for sleeve installation shall be considered incidental to the sleeve installation. All asphalt cutting shall be done with proper equipment to allow straight and true cuts through the entire depth of the asphalt being removed. Compact the trench backfill to 95% with a minimum of a 6-inch ABC base and 6-inch asphalt top patch cover. Contractor shall replace any patch work if the patch compacts more than ½-inch or if any of the patches becomes dislodged within one year. All asphalt shall comply with MAG section 336.

440.7 – Valves, Valve Boxes, and Special Equipment Installation: *Add the following:*

Install all remote-control valves, gate valves, flow sensing equipment, pressure reducing valves, wye strainers, emitter flush plugs, and quick coupling valves in suitable plastic valve access box of proper size as required for easy access to the installed components. All valve boxes supplied shall be new Carson 1324 colored tan or approved equal. Jumbo or economy boxes are not an acceptable alternative. All valve boxes shall be installed with eight inches minimum of 3/4-inch sized clean washed gravel sump.

Valves shall include a solenoid plunger that shall be spring loaded so the valve may be operated when installed in any position and shall be constructed of stainless steel. The diaphragm shall be of durable nylon reinforced neoprene. Valve bonnet shall be equipped with an internally operated manual bleed mechanism for manual operation of the valve at any time. Valve bonnet shall be secured to the valve body by corrosion resistant stainless-steel bolts.

Backflow Prevention Assembly: The Backflow Prevention Assembly shall be installed per the details shown on the drawings and associated governing code requirements. Connect the backflow prevention assembly to the water meter with type K hard copper. Place the backflow prevention unit within two feet of the water meter. The water meter shall be provided to the irrigation contractor by the general engineering contractor, see plans and specifications for more detail. Provide enclosure to properly secure the assembly. The irrigation system shall not be operated until the assembly has been tested and certified to meet the requirements of the **City of Kingman**. Backflow Prevention Assembly enclosure shall be painted tan to blend in with surrounding environment. Contractor shall submit paint color chip sample to Engineer for approval prior to painting of enclosure.

After the backflow assemblies have been properly installed by the Contractor and approved by the Engineer, the system shall be inspected by the **City of Kingman** and tested to ensure that it is operating correctly and meets with the **City of Kingman** approval. Turn over back flow certifications to the Engineer.

All wiring for remote control valve operation shall be direct burial single strand copper, 600-volt. Common wire shall be 12 awg, control wire shall be 14 awg. Tape bundle wire at 20-foot centers. Allow for expansion at all changes in direction. No splices in wire will be allowed unless the wire length exceeds 2500 feet or to accommodate construction phases. All allowed splices shall be contained within valve boxes marked as Wire Splice.

Valve boxes shall not house more than one valve, quick coupler, or other type of equipment. Equipment that is currently housed together in on box shall be separated and placed in individual boxes.

440.9 – Automatic Control System Installation: *Add the following:*

Install new controller of the size shown on the plans in accordance with the plan details. Coordinate power service with local provider and **City of Kingman**.

The controller shall be installed within the pedestal enclosure per the plan details. Contractor shall modify the mounting column to match the plan details.

All common and control wiring shall be direct burial UF-600-volt single strand copper wire, PVC insulation, 14 gauge for control wiring, 14 gauge for common wiring.

Materials:

All wire between the irrigation controller and remote-control valves, sensors, pump relays and master valves to be 12 AWG solid copper for common, 14 AWG solid copper for control, UF-600 insulated type, direct burial.

Wire splices shall be Dri-Splice two-piece waterproof wire connectors.

Ground rod shall be 5/8” x 8’ solid copper.

Ground Strap shall be 4” x 96” x 0.064” copper flat strap.

Ground rod and strap connections shall be cad-weld type.

Wire splice boxes shall be Carson 1324, tan.

Construction Requirements:

Connections between the automatic controller and the electric solenoids at the control valves shall be made with two wire direct burial copper cable consisting of UF-600 12-gauge copper common wire and 14-gauge control wire insulated with PVC. Install in accordance with controller manufacturer's specifications.

Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines whenever possible and shall never be installed above or below the pipe.

An expansion curl shall be provided within 3 feet of each wire connection. Expansion curl shall be of sufficient length at each splice connection at each electric control, so that in case of repair the valve bonnet may be brought to the surface without disconnection of the control wires. Control wires shall be laid loosely in trench without stress or stretching of control wire conductors.

Field splices between the automatic controller and electrical control valves will not be allowed without prior approval of the Owner's Representative.

All control wiring installed under paving shall be installed in UL listed Schedule 40 electrical conduit. Conduit shall terminate at least 2 feet inside of a planting area. Conduit joints and fittings shall be solvent weld. Size shall be 1 1/2" minimum and larger as required and/or shown on the plans. Conduit can share same sleeves as irrigation water lines, but the wire must be within a separate schedule 40 conduit sleeve.

All control and common wire runs shall be continuous between the controller and the valves which they control unless the run length exceeds 2500 feet. All splices shall be housed in 1324 valve boxes, branded with wire splice on the cover and the locations noted on the as-built plans. Valve boxes shall be tan in granite, green in turf, or purple when used with non-potable water.

All wire connectors shall have a two-piece PVC housing which, when filled with resin epoxy and pressed together, forms a permanent, one-piece, moisture-proof wire splice. All connectors shall be UL listed, rated 600 volt, for PVC insulated wire. No wire splices shall be buried. All wire connectors shall be Dri-Splice Waterproof Wire Connectors or approved equal.

Provide a 24-inch excess length of wire in an 8-inch diameter expansion loop at each 90-degree change of direction, at both ends of sleeves, and at 100-foot intervals along the wire routing. Do not tape wiring within expansion loops.

Wire shall be red control with white common and a green spare wire looped through all boxes.

The grounding circuit shall consist of one 5/8-inch diameter x 8-foot-long copper grounding rod and one 4-inch x 96-inch ground plate placed as shown on the plan details. The ground rod and ground plate shall be tied together and to the controller's grounding circuit with #6 bare copper wire. Each ground rod shall be set a minimum of 8 inches below finished grade, ground straps 12 inches below finished grade, and shall be housed in 10-inch round valve boxes positioned to allow access to the ground clamp for service. The resistance of the ground to the controller should not exceed 10 ohms, as measured with a ground rod test set, to meet controller manufacturer's guarantee criteria.

A wiring schematic shall be placed in each controller enclosure. The schematic shall show all wire connections including the wire connections at the controllers and field splices in pull or junction boxes, such as those not occurring in scheduled and planned valve boxes.

440.10 – Flushing and Testing: *Add the following:*

(D) The following volumetric leakage test may be performed for gasketed mainline piping segments only, in lieu of the mainline pressure testing procedure indicated in MAG Specification Section 440.10:

Provide all necessary pumps, bypass piping, storage tanks, meters, supply piping, and fittings in order to properly perform testing. Backfill the trench to prevent movement of the pipe under pressure. Expose couplings and fittings. Purge air from pipeline before test. Subject the mainline pipe to 150 PSI for two hours. Water pressure must be maintained for the two-hour duration.

Replace any defective pipe, fitting, joint, valve, or appurtenance. Repeat the test until the subject mainline pipe meets the above maximum allowable volume loss during the test period.

Perform an operational test of the irrigation system in the presence of the Engineer and a representative from the **City of Kingman** Maintenance Division. Contact the Engineer and **City of Kingman** Authorized Representative three working days prior to testing.

440.11 Measurement and Payment: *Add the following:*

Payment for the irrigation distribution system shall be made on the basis of the bid price for each element of work identified on the bid schedule. These unit cost prices shall be full compensation for the system complete and in-place as described herein and on the plans.

PART 900 – SITE FEATURES AND SPECIALTY MATERAILS

SECTION 904 MISCELLANEOUS STREETSCAPE ITEMS

Materials: Submittals shall include but not be limited to the following:

Materials List: Include benches, trash receptacle bins, bike rack assembly, concrete unit pavers admix and stamping for decorative pavements. Quantities of materials need not be included.

Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating instructions for equipment shown on the materials list.

Shop Drawings: Submit shop drawings called for by the details. Show products required for proper installation, their relative locations, and critical dimensions.

904.1 WAYFINDING SIGN:

The work under this item shall consist of furnishing all materials, equipment, tools and labor necessary to install project wayfinding monument signs.

Measurement and Payment:

Payment for the wayfinding sign elements shall be made on the basis of the bid price for each element of work identified on the bid schedule. These unit cost prices shall be full compensation for the assembly complete and in-place as described herein and on the plans.

904.2 TRASH RECEPTACLE BIN (SURFACE MOUNT):

The work under this item shall consist of furnishing all materials, equipment, tools and labor necessary to install trash litter bins.

Measurement and Payment:

Payment for the trash receptacle bin elements shall be made on the basis of the bid price for each element of work identified on the bid schedule. These unit cost prices shall be full compensation for the assembly complete and in-place as described herein and on the plans.

904.3 METAL BENCH (SURFACE MOUNT):

The work under this item shall consist of furnishing all materials, equipment, tools and labor necessary to install surface mount metal benches.

Measurement and Payment:

Payment for the metal bench elements shall be made on the basis of the bid price for each element of work identified on the bid schedule. These unit cost prices shall be full compensation for the assembly complete and in-place as described herein and on the plans.

904.4 BIKE RACK ASSEMBLY (SURFACE MOUNT):

The work under this item shall consist of furnishing all materials, equipment, tools and labor necessary to install surface mount metal bike racks.

Measurement and Payment:

Payment for the bike rack assembly elements shall be made on the basis of the bid price for each element of work identified on the bid schedule. These unit cost prices shall be full compensation for the assembly complete and in-place as described herein and on the plans.

904.5 SPECIALTY PAVEMENT SIDEWALK CONCRETE FINISH (INTEGRAL COLOR / EXPOSED AGGREGATE COLOR TEXTURE)

The work under this item shall consist of furnishing all materials, equipment, tools and labor necessary to install integral color and exposed aggregate concrete.

Measurement and Payment:

Payment for the specialty pavement sidewalk concrete elements shall be made on the basis of the bid price per Square Foot (SF) element of work identified on the bid schedule. These unit cost prices shall be full compensation for the assembly complete and in-place as described herein and on the plans.

904.6 SPECIALTY PAVEMENT CROSSWALK CONCRETE FINISH (STAMPED COLOR TEXTURE)

The work under this item shall consist of furnishing all materials, equipment, tools and labor necessary to install stamped colored concrete.

Measurement and Payment:

Payment for the specialty pavement crosswalk concrete elements shall be made on the basis of the bid price per Square Foot (SF) element of work identified on the bid schedule. These unit cost prices shall be full compensation for the assembly complete and in-place as described herein and on the plans.

904.7 SPECIALTY PAVEMENT CONCRETE PAVERS

The work under this item shall consist of furnishing all materials, equipment, tools and labor necessary to install concrete pavers as located on the plans.

Measurement and Payment:

Payment for the specialty pavement concrete pavers elements shall be made on the basis of the bid price per Square Foot (SF) element of work identified on the bid schedule. These unit cost prices shall be full compensation for the assembly complete and in-place as described herein and on the plans.

904.8 TREE GRATE ASSEMBLY

The work under this item shall consist of furnishing all materials, equipment, tools and labor necessary to install metal tree grate assemblies as located on the plans.

Measurement and Payment:

Payment for the tree grate assembly elements shall be made on the basis of the bid price each element of work identified on the bid schedule. These unit cost prices shall be full compensation for the assembly complete and in-place as described herein and on the plans.

904.9 SPECIALTY PAVEMENT RECYCLED BRICK PAVERS

The work under this item shall consist of furnishing all materials, equipment, tools and labor necessary to install concrete pavers as located on the plans. Brick pavers shall be provided by the City. Contractor to coordinate pick up of existing pavers as indicated by the City of Kingman.

Measurement and Payment:

Payment for the specialty pavement recycled brick paver elements shall be made on the basis of the bid price per Square Foot (SF) element of work identified on the bid schedule. These unit cost prices shall be full compensation for the assembly complete and in-place as described herein and on the plans.

904.10 GREEN INFRASTRUCTURE STORAGE ZONE

The work under this item shall consist of furnishing all materials, equipment, tools and labor necessary to install green infrastructure storage zone development feature area as located on the plans.

Measurement and Payment:

Payment for the green infrastructure storage zone elements shall be made on the basis of the bid price per Square Foot (SF) element of work identified on the bid schedule. These unit cost prices shall be full compensation for the assembly complete and in-place as described herein and on the plans.